Remarks

Reconsideration and allowance of the above-referenced application are respectfully requested.

Upon entry of this amendment, claims 7-30 and 37-44, as amended, and newly added claims 48-60 will remain in the application.

Section 103 rejections

Claims 7-24 and 37-42 were rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Imahashi et al. (US 5,413,954) in view of Celler et al. (US 4,406,709).

Applicants teach irradiating a semiconductor film on a substrate with a linear laser beam while flattening the substrate against the surface of a stage with a vacuum, as shown in Figures 18A-C. A linear laser beam may be selected for irradiating a substrate when uniform crystallization of the irradiated (scan) surface is desired. During the scan, the linear laser beam irradiates the entire surface of the semiconductor film. If the substrate is warped, the focal point of the linear laser beam may shift. The shift in the focal point may result in shifts in power delivered to the surface, which may in turn result in varied crystallization of the irradiated surface, as described at page 4, lines 22-31 of the Specification.

As stated in the Action, Imahashi et al. do not teach vacuum-holding the lower surface of the substrate in contact with the flat surface of the stage during irradiation. Imahashi et al. make no mention of flattening the substrate during irradiation or the advantage of doing so.

Celler et al. briefly mention that in one experiment, a vacuum chuck was used to hold a sample during irradiation. The purpose of using the vacuum chuck was to heat the substrate. Celler et al. make no mention flattening the substrate during irradiation or the advantage of doing so.

The Action states that one skilled in the art would have combined the teachings of Imahashi et al. and Celler et al. because it would have been "convenient" to do so. However, "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." MPEP 2143.01 citing In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, "The level of skill in the art will rarely provide the motivation to combine known elements when the prior art lacks any such suggestion." Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308 (Fed. Cir. 1999).

Neither Imahashi et al. nor Imahashi et al. teach or suggest that there is any advantage to flattening the substrate during irradiation and hence, neither suggest the desirability of the combination. Accordingly, Applicants submit that the combination is improper. Furthermore, Applicant submits that Celler et al. do not teach flattening of the substrate. The Action states that any substrate held successfully be a vacuum chuck must tend to flatten by the pressure difference. However, silicon wafers are relatively rigid structures, and the minimum amount of suction necessary to hold a wafer in place may be well below that required to flatten the relatively rigid substrate against the face of the vacuum chuck.

For the reasons given above, Applicants submit that independent claims 7, 10, 13, 16, 19, and 22, as amended, and their dependencies should be allowed.

Attached is a marked-up version of the changes being made by the current amendment.

Applicant asks that all claims be allowed. Enclosed is a $522 check for excess claim fees and for the Petition for Extension of Time fee. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 10/1/01

Scott C. Harris
Reg. No. 32,030

Fish & Richardson P.C.
PTO Customer No. 20985
4350 La Jolla Village Drive, Suite 500
San Diego, California 92122
Telephone: (858) 678-5070
Facsimile: (858) 678-5099

10134456.doc

<u>Version with markings to show changes made</u>

<u>In the claims:</u>

Claims 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, and 24 have been amended as follows:

7. (Amended) A method of manufacturing a [liquid crystal display] <u>semiconductor</u> device comprising the steps of:

forming a semiconductor film over <u>an upper surface of</u> a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

<u>setting said substrate onto a stage having a flat surface in such a manner that a lower surface of said substrate is in contact with said stage;</u>

flattening said substrate by vacuum-sucking <u>said lower surface of</u> said substrate [onto a stage having a flat surface in such a manner that said lower surface of said substrate is in contact with said flat surface of the stage]; and

irradiating said semiconductor film with a laser beam having a cross section which is elongated in one direction while relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], <u>and</u> while [said lower surface of said substrate is in contact with said flat surface of the stage] <u>vacuum-sucking said lower surface of said substrate</u>.

9. (Amended) A method according to claim 7 wherein [at least a part of the flattened substrate constitutes the] <u>said semiconductor device is a</u> liquid crystal display device.

10. (Amended) A method of manufacturing a [liquid crystal display] semiconductor device comprising the steps of:

forming a semiconductor film over an upper surface of a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

setting said substrate onto a stage having a flat surface and at least one suction inlet in such a manner that a lower surface of said substrate is in contact with said stage;

flattening said substrate by vacuum-sucking said lower surface of said substrate [onto a stage having a flat surface and at least one suction inlet in such a manner that said lower surface of said substrate is in contact with said flat surface of the stage]; and

irradiating said semiconductor film with a laser beam having a cross section which is elongated in one direction while relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], and while [said lower surface of said substrate is in contact with said flat surface of the stage] vacuum-sucking said lower surface of said substrate.

12. (Amended) A method according to claim 10 wherein [at least a part of the flattened substrate constitutes the] said semiconductor device is a liquid crystal display device.

13. (Amended) A method of manufacturing a [liquid crystal display] semiconductor device comprising the steps of:

forming a semiconductor film over a lower surface of a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

heating said [substrate] semiconductor film;

<u>setting said substrate onto a stage having a flat surface in such a manner that a lower surface of said substrate is in contact with said stage;</u>

flattening said substrate by vacuum-sucking <u>said lower surface of</u> said substrate [onto a stage having a flat surface in such a manner that said lower surface of said substrate is in contact with said flat surface of the stage]; and

irradiating said semiconductor film with a laser beam having a cross section which is elongated in one direction while relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], <u>and</u> while [said lower surface of said substrate is in contact with said flat surface of the stage] <u>vacuum-sucking said lower surface of said substrate</u>.

15. (Amended) A method according to claim 13 wherein [at least a part of the flattened substrate constitutes the] <u>said semiconductor device is a</u> liquid crystal display device.

16. (Amended) A method of manufacturing a [liquid crystal display] <u>semiconductor</u> device comprising the steps of:

forming a semiconductor film over <u>an upper surface of</u> a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

heating said [substrate] <u>semiconductor film</u>;

<u>setting said substrate onto a stage having a flat surface and at least one suction inlet in such a manner that a lower surface of said substrate is in contact with said stage;</u>

flattening said substrate by vacuum-sucking <u>said lower surface of</u> said substrate [onto a stage having a flat surface and at least one suction inlet in such a manner that said lower

surface of said substrate is in contact with said flat surface of the stage]; and

irradiating said semiconductor film with a laser beam having a cross section which is elongated in one direction while relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], and while [said lower surface of said substrate is in contact with said flat surface of the stage] vacuum-sucking said lower surface of said substrate.

18. (Amended) A method according to claim 16 wherein [at least a part of the flattened substrate constitutes the] said semiconductor device is a liquid crystal display device.

19. (Amended) A method of manufacturing a [liquid crystal display] semiconductor device comprising the steps of:

forming a semiconductor film over an upper surface of a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

heating said substrate to crystallize said semiconductor film;

setting said substrate onto a stage having a flat surface in such a manner that a lower surface of said substrate is in contact with said stage;

flattening said substrate by vacuum-sucking said lower surface of said substrate [onto a stage having a flat surface in such a manner that said lower surface of said substrate is in contact with said flat surface of the stage]; and

irradiating the crystallized semiconductor film over said substrate provided on said stage with a laser beam having a cross section which is elongated in one direction while

relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], and while vacuum-sucking said lower surface of said substrate.

21. (Amended) A method according to claim 19 wherein [at least a part of the flattened substrate constitutes the] said semiconductor device is a liquid crystal display device.

22. (Amended) A method of manufacturing a [liquid crystal display] semiconductor device comprising the steps of:

forming a semiconductor film over an upper surface of a substrate [having an upper surface and a lower surface, wherein said upper surface is an insulating surface];

heating said substrate to crystallize said semiconductor film;

setting said substrate onto a stage having a flat surface and at least one suction inlet in such a manner that a lower surface of said substrate is in contact with said stage;

flattening said substrate by vacuum-sucking said lower surface of said substrate [onto a stage having a flat surface and at least one suction inlet in such a manner that said lower surface of said substrate is in contact with said flat surface of the stage]; and

irradiating the crystallized semiconductor film with a laser beam having a cross section which is elongated in one direction while relatively moving said substrate with respect to said laser beam [so that the entire surface of said semiconductor film is irradiated], and while [said lower surface of said substrate is in contact with said flat surface of the stage] vacuum-sucking said lower surface of said substrate.

24. (Amended) A method according to claim 22 wherein [at least a part of the flattened substrate constitutes the] said semiconductor device is a liquid crystal display device.

Claims 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, and 60 are added.

--45.(New) A method according to claim 7 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

46. (New) A method according to claim 10 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

47. (New) A method according to claim 13 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

48. (New) A method according to claim 16 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

49. (New) A method according to claim 19 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

50. (New) A method according to claim 22 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

51. (New) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film over an upper surface of a substrate;

setting said substrate onto a stage having a flat surface in such a manner that a lower surface of said substrate is in contact with said stage;

flattening said substrate by vacuum-sucking said lower surface of said substrate; and

irradiating said semiconductor film with a laser beam while relatively moving said substrate with respect to said laser beam, and while vacuum-sucking said lower surface of said substrate.

52. (New) A method according to claim 51 wherein said laser beam is an excimer laser beam.

53. (New) A method according to claim 51 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

54. (New) A method according to claim 51 wherein said substrate is a glass substrate.

55. (New) A method according to claim 51 wherein said semiconductor device is a liquid crystal display device.

56. (New) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film over an upper surface of a substrate;

heating said semiconductor film;

setting said substrate onto a stage having a flat surface in such a manner that a lower surface of said substrate is in contact with said stage;

flattening said substrate by vacuum-sucking said lower surface of said substrate; and

irradiating said semiconductor film with a laser beam while relatively moving said substrate with respect to said laser beam, and while vacuum-sucking said lower surface of said substrate.

57. (New) A method according to claim 56 wherein said laser beam is an excimer laser beam.

58. (New) A method according to claim 56 wherein an entire surface of said semiconductor film is irradiated by said laser beam.

59. (New) A method according to claim 56 wherein said substrate is a glass substrate.

60. (New) A method according to claim 56 wherein said semiconductor device is a liquid crystal display device.--